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# THE JOURNAL OF PHILOSOPHY

## PSYCHOLOGY AND SCIENTIFIC METHODS

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### NON-SENSORY COMPONENTS OF SENSE PERCEPTION<sup>1</sup>

THE familiar equivocal staircase figure, if looked at for some time, appears successively as the upper side and as the lower side of a flight of stairs, and perhaps in other ways which need not here be considered. The figure appears to change its character, having now what we may call the upper-side quality and again the under-side quality. Or, we may equally well say, it arouses in the observer sometimes an upper-side consciousness and sometimes an under-side consciousness, for the two qualities, so far from being only marginally present, dominate the field, and the transition from one to the other is striking and at first surprising. The two qualities are markedly different, even antagonistic; and it is a very pretty puzzle to discover in what their difference consists.

The difference might after all reside in the visual sensations, for though the figure remains the same, certain fixation points are more favorable for arousing the upper-side appearance, and others for arousing the under-side appearance. The experiments of several observers<sup>2</sup> have, however, shown that difference of fixation point is not essential for producing the difference in appearance. Either quality may, with practise, be got with any fixation point, on or off the figure; and the change from one quality to the other may occur in examining the after-image of the figure, a condition which guarantees that no shifting of the retinal image shall occur. Moreover, a fresh observer, who usually gets first the upper-side quality, lets his eyes roam freely over the figure without changing its appearance. We are thus driven from the position that the difference between the two qualities is one of visual sensation. Exactly the same retinal picture may give rise to either percept.

Another source of sensation has to be considered; for eye movements often occur during examination of the figure. Is it a differ-

<sup>1</sup> Read at the fifteenth annual meeting of the American Psychological Association, December 29, 1906.

<sup>2</sup> W. MacDougall, *Mind*, 1906, Vol. 15, pp. 330 ff.; Wallin, 'Illusions of Reversible Perspective,' 1905, p. 262; Burmester, *Zeitschrift für Psychologie*, 1906, Vol. 41, p. 325.

ence in the feeling of the eyeballs that distinguishes the upper from the lower side of the stairs? Such a view is made difficult by the facts already cited. There is no indissoluble association between any particular eye movement and the upper-side or under-side quality. Beginners often move their eyes in every way over the figure without losing their first mode of perception; and practised observers are able to get the same appearance with either of two opposite movements. When an eye movement is felt, it seems to follow rather than precede the change in quality; and it is felt as something of an entirely different nature from the change in the appearance of the figure.

We are left, then, not only with an equivocal figure, but with an equivocal mass of sensations. The same sensations give rise to two diverse percepts. The difference between the two states of consciousness must, then, according to a widely accepted view, be a difference of images. There must be two images or sets of images, one appropriate to the upper side of stairs, and the other to the under side; and either set of images is necessary and sufficient to give the corresponding appearance. It seemed worth while to inquire into the actual presence of these images, and the unanimity of response was surprising. Persons who, on being examined as to the state of mind occurring just before a voluntary movement or during the solution of an intellectual problem, reported a varying richness of imagery, agreed in the case of the staircase figure in reporting none. They were asked as to the presence of visual, verbal and kinesthetic imagery, but answered with remarkable confidence that there was none.<sup>3</sup> The absence of visual imagery was especially noteworthy. One would expect that the bare outline of the figure would be filled in with imagery of real stairs, but my subjects agreed that they saw nothing but the figure; they saw the lines in the staircase form.

The imagemongers are ready with a reply to this sort of examination of their hypothesis. The image was there after all, they will say; it was simply so vague and marginal as to escape introspective notice. But the difference between the upper-side and the under-side qualities in consciousness is clear-cut, striking, absorbing; there is nothing vague about it, nothing marginal. You can not analyze these sharply distinguished qualities into a mass of sensation which is common to both, and differing accretions of imagery which are too slight and vague to be noticed. Something

<sup>3</sup> Sometimes there were feelings in the eyes regarding which some subjects could not decide whether they were images or sensations; and in some such cases I was unable to see any movement of their eyes. These feelings were subjectively like the feelings of accommodation, and were more probably sensations than images.

more is there. This something more is nothing else than the quality of the upper side of stairs, or of the lower side. My subjects refused to analyze it further, and the attempts to reduce it to sensory terms have failed. It is perhaps unanalyzable, though it may no doubt be classified with other qualities on the basis of felt likeness and difference. It may be called, with Ehrenfels, a form quality; in consideration, however, of the distinction between it and purely sensory qualities, I should prefer calling it a percept quality. It is a non-sensorial component of sense perception.

To advance abruptly from this special case to a general statement, I would advocate the view that every percept has a quality of its own—a felt quality—which can not usually be analyzed into sensory qualities or syntheses of such. I will not attempt a classification of percept qualities, for such a classification, in truly psychological terms, can only come as the result of much painstaking work; and it appears to me that the progress of fruitful study of the non-sensory *functions*—which all must admit to exist—has been delayed by the conviction that, descriptively at least, you can do nothing with a percept or thought except to point out its sensory components. I will, however, call attention to a few more instances in which other than sensory qualities are to be easily found.

First the dot figure, employed in the experiments of William MacDougall and of Benussi. A number of dots arranged either regularly or irregularly on a plain background do not always look the same. The observer passes from one grouping of them to another, in a way that recalls the changes in the staircase figure. A good figure for some purposes consists of a central dot, surrounded by six others in the form of a regular hexagon. This figure can be seen in a large variety of ways, while the fixation point remains on the central dot. The same changes of grouping can be produced in the after-image of the figure, which shows, as before, that visual sensations do not determine the changes. Eye movements are very apt to be felt, but are often, at least, subsequent to the change in grouping, and therefore not its cause nor constitutive of the essential differences between the group qualities. Imagery is usually undetected. In short, the same argument holds as was applied to the case of the staircase figure: the groupings are not describable in sensory or motor terms, but are non-sensory qualities.

Analogous sense material in the auditory sphere is furnished by a uniformly spaced series of equal sounds. Such a series is often heard in rhythmic form, and the same series may be heard in different rhythms. For example, a series of seven sounds may be heard either in  $3/4$  rhythm or in  $6/8$  rhythm. These differences are not contained in the stimulus, which is equivocal. Nor are

they necessarily represented by imagery. The only question is whether they are not presented by the movements of beating time which are apt to accompany the consciousness of rhythm. There are two objections to interpreting the differences in rhythmic consciousness as differences in movement. First, a record of the movements shows that they are so timed as to synchronize with the sounds which they emphasize; they are not, therefore, reflex effects of these sounds, but must be effects of the consciousness of the rhythmic form; they presuppose this consciousness, and do not constitute it. And second, the recorded movements are often so irregular in accents and pauses that the feeling of them could not possibly constitute the well-organized feeling of rhythm. It would often be impossible to tell from the recorded movements which of the two rhythmic forms was being got. The rhythms are percept qualities.

It is a commonplace in psychology that the visual perception of size and distance calls for more than the sensations of the moment. The imagery hypothesis will have it that in perceiving an object at different distances as of the same size, we picture it as it would look at a certain standard distance, or reproduce the sensations of handling it; such images are, however, not reported by the subjects whom I have examined. In perceiving distance the imagery hypothesis speaks of images of oneself walking to the object; and I suppose that in comparing the distances of two objects one is supposed to have vague images of oneself walking in turn to each of them. Such images, if present, are truly vague, whereas the perception of distance is clear. The truth is that the appropriate size qualities and distance qualities are clapped on to the sense presentation without the intermediary of sensorial imagery.

Another sort of percept qualities are the thing qualities. A clanging noise, let us reasonably suppose, sounds in our ears as we sit here, and is immediately perceived as the ringing of a street-car bell. The consciousness of the thing, car, is something more than the heard noise. Some of us may experience, in addition, the visual image of a car, others may hear the word *car*, others may feel as if they were running to escape from a car. Others will experience none of these forms of imagery, and yet will be clearly conscious that it is a car-bell they hear. If a musical instrument is held up before you, some will immediately hear its peculiar note; but more will not, and yet will perceive the thing as a definite kind of musical instrument. The thing quality is probably present alike in all our minds. It is interesting to note in what straits the imagery hypothesis lands us, in the light of individual differences in imagery. You, let us say, on hearing the clanging noise, see a

car; your neighbor hears the word *car*. As the visual and auditory images have no internal likeness, your perceptions are entirely unlike save for the clanging noise. Yet in some way you agree; and may live together for years, agreeing in all sorts of perceptions, with never a suspicion that you have nothing in common but the pure sensory data—so far as even these are common.

Percept qualities appear to be numerous. Each thing perceived, each size and shape distinguished, probably we should add each relation observed, has its own felt quality, which is not one of the qualities of sensation. The attempt to describe percept qualities as syntheses of sensory qualities is hypothetical in the second degree. The presence of the required images is hypothetical; and no less hypothetical is the power of the images, if present, by combining with the sensation to produce a percept. They might fuse, no doubt! But is the feeling-together of clanging noise and visual picture fully equivalent to the perception of a ringing car-bell? Were the two not felt as attributes of one thing, their mere simultaneous presence in consciousness would not give the percept which is actually experienced. The thing quality must be present if we are to have the consciousness of a thing or of properties of a thing.

A certain air of mysticism, pervading our percept qualities and indeed the whole doctrine of imageless thought, will perhaps be dispelled by the introduction of a conception which is well fitted to take the place of that of synthesis. I call this conception that of mental reactions. A percept is not a synthesis of sensation and image; it is a reaction to the sensation. It is not a motor reaction, but a mental reaction. In the broadest definition, a mental reaction is a mental effect of some, often conscious, cause. Thought *A* calls up thought *B*; *A* is the stimulus, *B* the response or reaction. In the case of the staircase figure, the sight of the lines is the stimulus, the thought of the upper side or of the under side of stairs is the response. This conception certainly seems obvious and trite enough. But its implications are worth considering. The response, though aroused by the stimulus, is a new event, not to be resolved into terms of the qualities of the stimulus. No one attempts to describe a motor reaction in terms of the stimulus that arouses it; the pupillary reflex can not be described in terms of the brightness of light, nor the scratch reflex as a synthesis of sensations of itching. The motor reaction is a new event, causally dependent on the stimulus, but having its own identity, its own peculiar quality. So, a mental reaction has its own identity, its own peculiar quality. A certain mass of sensations, itself aroused by the light reflected from a printed page, suggests a word. The word consciousness is

a new event, not describable in terms of the sensations that aroused it. Nor is it describable in terms of auditory imagery, in case this should also be aroused; for auditory sensations would themselves be but the stimulus to the mental reaction of hearing a word. The word qualities, aroused by hearing or reading, are qualities in their own right; not sense qualities, nor syntheses of such, but percept qualities.

*Nihil est in intellectu quod non prius in sensu.* As a psychological doctrine this is false; the content of thought includes qualities not included in sensation. Nor is it true with the qualification, *nisi intellectus ipse*, for it is not simply an activity nor a universal form of thought that is added to sensation. There is not one additional quality, but many, corresponding to the multiplicity of percepts and thoughts. As well might one say, *Nihil est in motu quod non prius in sensu*, or qualify this merely with *nisi motus ipse*. It is true in both cases that the reaction, whether motor or mental, is ultimately dependent on sensation as its exciting cause; and this fact, from the point of view of the criticism of knowledge, is perhaps as significant as the literal truth of the old maxim would be. But psychologically it makes a great difference whether we say that all consciousness is sensory, or whether we simply say that all forms of thought are primarily responses to sensation. The former statement is entirely inadequate to the facts of psychology; the latter has at least great biological probability.

The concept of a mental reaction is indeed essentially biological; and the doctrine of percept qualities, and of non-sensorial components of thought in general, appears specially natural and probable in the light of brain physiology. The mere fact that the sensory centers cover so small a portion of the cortex is suggestive. It may be that the non-sensory areas contribute no new qualities of consciousness for the good reason that they are unconscious; and to this view so acute a sensationalist as William MacDougall<sup>4</sup> is logically driven. There is no *a priori* impossibility in such a view—nothing is impossible—but there is surely no such strong probability about it as to fortify the sensationalistic doctrine. Much more likely it seems that consciousness attends the activity of the non-sensory areas, and that such consciousness is non-sensory. But we have more than this general balance of probability in our favor. All the definite knowledge we possess of brain physiology goes to show that the principle of the mental reaction is sound—that, by means of association fibers, the sensory areas excite other areas and these in turn others, tending finally, no doubt, but by no means always directly, toward the motor area; and that with each new reaction new qualities of conscious-

<sup>4</sup> 'Physiological Psychology,' p. 92.

ness arise. Our definite knowledge comes mostly from the study of the aphasias and similar losses of function. We know, for example, a visual area in the neighborhood of the calcarine fissure, destruction of which causes blindness. We know also that the destruction of some of the neighboring areas causes not loss of visual sensation, but loss of the power to perceive printed words. It is not the pure sensory appearance that is lost, nor is it solely the associated sound of the words—an association which, as we know from normal experience, is not necessary in reading—nor again the associated feeling of the spoken words. It is not exactly the comprehension of the meaning of the words, for the patient may be intellectually sound;<sup>5</sup> it is simply the quality of seen words. Similar statements can be made regarding word-deafness. The indications are certainly that the retinal excitation first arouses the activity of the visual sensory area. This is the first of a chain of cerebral reactions, the visual area arousing the near-by word-perceiving area, and this in turn probably other areas whose function is the understanding of the word and the providing of related ideas. Each of these reactions is a new cerebral event and is apparently attended by a new mental event; the word-blind individual has lost, not only a function, but he has lost certain forms of consciousness that normally go with reading. Cases of object-blindness and of music-deafness show that other reactions besides the linguistic are carried out in a similar way. The perception of an object through sight depends not only on the visual area, and not on the associated activity of other sensory areas, such as might reproduce other sensations derived from the same object—and not, it should be added, on the activity of the motor area—but on the activity of a special area, the function of which is simply to perceive a certain sort of object.

Though each perception area is primarily excited from a corresponding sensory area, there is good reason to believe that it can later be aroused from other parts of the brain. Dr. Marshall, in a recent article,<sup>6</sup> has presented with much force a view closely related to that of this paper. The lack of vividness and sensory incisiveness which characterizes an image is due, he urges, to the fact that in the correlated brain activity, not the sensory centers are active, but closely connected centers that were at first aroused by the sensory centers. There is much in the experience of persons with poor imagery to support this view. One may think of three shades of red, and afterwards pick them out from a miscellaneous lot of colors, and yet have

<sup>5</sup> This statement should now be made with some reservation, in view of the current discussion of aphasia, begun by Marie. But it remains true that word-blindness does not involve inability to have certain meanings or concepts, but only the inability to have these aroused through reading.

<sup>6</sup> *Mind*, 1906, N. S., Vol. 15, pp. 61-62.

had nothing like a reproduced sensory experience of the reds, nor necessarily any names for them. A large number of similar facts, which will probably well repay investigation, seem to show that the content of reflective thought, even where it is concerned with physical objects, consists more essentially of percept qualities than of sensory qualities.

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## HUMANISM AND ABSOLUTE SUBCONSCIOUSNESS

IT is characteristic of modern thought about the absolute that it depends mostly upon an interpretation, usually vague and unrestrained, of the implicates of self-consciousness. Awareness—at least in outline, if not in detail—of an absolute experience is involved in those finite feelings of self-transcendence in which alone self-consciousness consists. So philosophy since Descartes has reiterated.

Even radical empiricism must admit that once an agent becomes self-conscious, his simplest sense-experiences, his most frivolous processes of attention or will, his pettiest emotions, do nevertheless, in their own measure, implicate an absolute experience as their ground. The humanist temper, curiously enough, is itself becoming radically self-conscious in its opposition to absolutism. In its habitual celebrations of common sense, humanism inadvertently caricatures the celebrated 'plain man.' It seems to characterize him as a person in whose eyes there is no glimmer of speculation whatsoever, for whom there simply is no beyond, no mystery, no unknown he might not fathom and manipulate *if only he had the will*. But humanism, when it rises above this initial plane of brute pragmatism, will feel the need of larger equipment as a philosophic method. It can prevail, if at all, not merely by substituting for the 'romantic insolence' of the older idealism this endless tragedy of human nescience. In the place of this practical denial of the residual God of self-conscious experience, it must order its own humane yet certified account of ultimate existence.

After all, between humanism and absolutism there should be only a difference in their respective ways of interpreting the implicates of self-conscious experiences; a variation in the respective moods—the one quiescent and beatific, the other militant, heroic, affirmative—in which they face that subconscious region wherein all radical experiences tend to lose themselves. To the absolutist temperament there is something delicious, to the humanist something horrible and ghastly, in this process by which its self-conscious finitude is sopped up in the subconscious. Out of this single yet radical conflict of